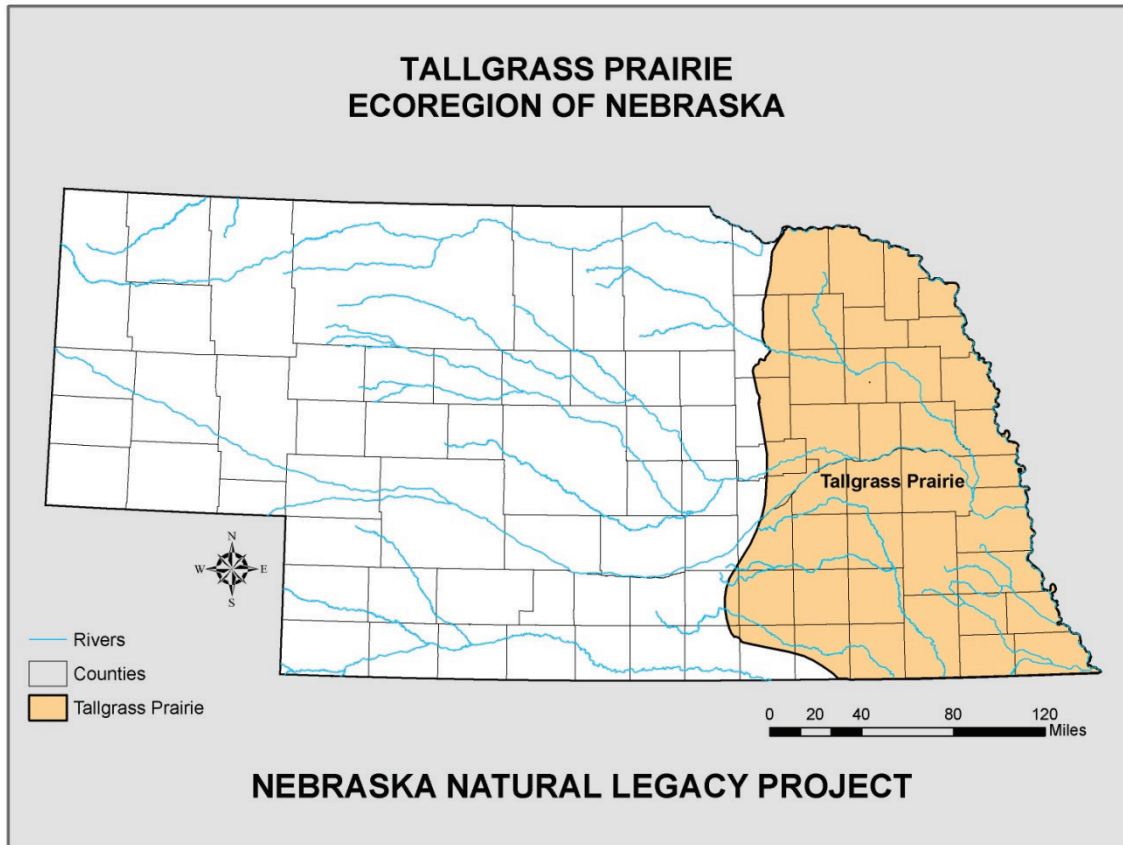


## Chapter 5

### Tallgrass Prairie Ecoregion



### Introduction

Early explorers described the tall-grass region as a sea of grass with open horizons and abundant wildflowers rooted in rich soils. The tall-grass prairie once extended from eastern Nebraska to Indiana and from Texas to southern Canada. In Nebraska, the Tallgrass Prairie Ecoregion covers the eastern fourth of the state, but this prairie type also extends further westward into the Mixedgrass and Sandhills Ecoregions along stream valleys of the Republican, Platte, Loup, and Niobrara rivers. Today less than one percent of tall-grass prairie remains in the continental United States. Approximately two percent of Nebraska's tall-grass prairie remains mostly as remnants less than eighty acres in size.

Glaciers, wind and water have shaped the topography of the tallgrass region over the last several million years. Today, the land surface is mainly rolling hills intersected by stream valleys. The elevation changes from 850 feet above sea level in the far southeastern corner of Nebraska to approximately 1,700 feet at the western edge of the Tallgrass Prairie Ecoregion. Receding glaciers left evidence of their passing through till deposits and hilly

moraines. After the glaciers receded, windblown loess was deposited over the till. These materials, with organic matter provided by thousands of years of prairie vegetation, form the basis for the deep, fertile soils that typify eastern Nebraska.

The Tallgrass Prairie Ecoregion receives 25 to 36 inches of annual precipitation, more than other ecoregions in the state. Roughly three-fourths of the rainfall is during the growing season, between April and September with May and June being the wettest months. Temperatures average highs of 90 degrees Fahrenheit in mid-summer and lows of 10 degrees Fahrenheit in mid-winter.

The ecoregion contains stretches of two of Nebraska's major rivers. The Missouri River is the state's largest river and forms the northern and eastern boundaries of the Tallgrass Prairie Ecoregion flowing approximately 350 miles in Nebraska. Along the river, the terrain includes bluffs and river terraces and floodplains.

The Platte River is a classic example of a prairie river. Historically, the river was shallow with a braided channel measuring three miles at its widest with a multitude of sandbars. The floodplain was 15 miles wide and was typically covered with lush wet meadows and freshwater marshes. Spring floods limited tree growth and created wide sandbars barren of vegetation. The ecoregion has many smaller streams including Papio Creek, Turkey Creek, and Bazile Creek.

This ecoregion includes several types of wetlands including the saline wetlands and Todd Valley wetlands. Eastern saline wetlands occur in swales and depressions within the floodplains of Salt Creek and its tributaries in Lancaster and southern Saunders counties. The salinity originates from salt-rich groundwater inflow. The salts are derived from underground rock formations deposited by an ancient sea that once covered Nebraska. These wetlands have saline soils and salt-tolerant vegetation. The Todd Valley wetlands are small, clay-lined, closed depressions located in loess soils. They are seasonally-flooded and are found in an ancient valley of the Platte known as the Todd Valley.

### **Vegetation**

Though historically upland tall-grass prairie was the dominant plant community of the region, eastern Nebraska has a diversity of other community types ranging from deciduous woodlands to saline wetlands. Upland tall-grass prairie is dominated by big bluestem, Indian grass, switchgrass and Canada wild-rye. These grass species can reach six feet or taller, especially when rooted in rich, moist stream valleys. Tall-grass prairies also include hundreds of species of wildflowers and other forbs. Examples of these include showy goldenrod, prairie blazing-star, skyblue aster and purple coneflower.

Native woodlands are found mainly in the more mesic and fire-protected stream valleys and bluffs. They are most extensive in the Missouri River valley and its lower tributaries. Cottonwoods, willows, boxelders, and American elm dominate wetter floodplain woodlands in the tallgrass region. The drier river bluffs support oaks, hickories, basswood, black walnut and other deciduous trees. These woodland habitats, particularly oak and hickory bluff woodlands provide essential habitat for migrating birds.

Wet meadows are found in stream valleys where the water table remains near the soil surface throughout the year. The loamy to sandy soils support lush vegetation dominated by sedges, spikerushes, prairie cordgrass and switchgrass. Marshes were common in river floodplains prior to settlement. Common marsh plants included broad-leaf cattail, bulrushes, bur-reed, smartweeds, and arrowheads.

### **Animals**

More than 300 species of resident and migratory birds have been documented in the Tallgrass Prairie Ecoregion. Nesting waterbirds include wood duck, green heron, northern pintail, blue-winged teal and mallard. The region supports populations of greater prairie-chicken and a full complement of grassland birds including Henslow's sparrow, dickcissel, grasshopper sparrow, bobolink, vesper sparrow and Swainson's hawk. Although woodlands are mostly confined to stream corridors, woodland species such as Bell's vireo, black-and-white warbler, rose-breasted grosbeak, and orchard oriole are common breeding species.

The Tallgrass Prairie Ecoregion is home to more than 55 mammal species; most have a widespread distribution and can also be found in central and western Nebraska. The small mammal fauna of the region includes plains pocket gopher, prairie vole, plains pocket mouse, thirteen-lined ground squirrel, and Franklin's ground squirrel. Species such as the masked shrew and jumping mouse can be found associated with wet meadows and other wetlands. Prior to European settlement, the tallgrass prairie region was home to large mammals such as bison, elk, and mule deer. Free-roaming bison no longer occur in the region; however, white-tailed deer are common big game animals and mule deer are infrequently found in upland grasslands. The most abundant large predator of the region is the coyote, but other predators such as the red fox and American badger can be found here as well. The bobcat, least weasel, long-tailed weasel and American mink can be found in wooded areas, wetlands and along river valleys. The native large predators that were present prior to European settlement such as the mountain lion, black bear, grizzly bear, and gray wolf are extremely rare or extirpated from the region.

Streams, rivers and lakes in the Tallgrass Prairie Ecoregion are home to over 75 species of fish. Many common species are big river generalists that can withstand wide variation of environmental extremes. Among these are the channel catfish, flathead chub and river carpsucker. Game fish, primarily northern pike, largemouth bass, walleye, and bluegill, have been introduced into many lakes and ponds. Exotic species such as grass, common, silver and bighead carp have found their way into most of the major rivers and lakes in the region.

Fifty-three species of amphibians and reptiles are found in the Tallgrass Prairie Ecoregion, including two salamanders, five toads, six frogs, eight turtles, up to eight lizard species and twenty-four snakes. All of the amphibians use wetlands for breeding; however, the Great Plains toad, plains spadefoot and Woodhouse's toad spend most of their adult life in the uplands. Aquatic turtles such as the northern painted turtle, false map turtle and common snapping turtle are common in wetlands, lakes and ponds. The six-lined racerunner and northern prairie skink inhabit dense grasslands and are relatively common but seldom seen. The five-lined skink inhabits the Tallgrass Prairie Ecoregion but is rare. The bull snake, western fox snake, yellow-bellied racer and plains garter snake are the most common snakes.

The venomous timber rattlesnake, massasagua and copperhead have highly limited distributions.

Insects are the most diverse and least studied animal group in the Tallgrass Prairie Ecoregion. They may also be the most important group ecologically and economically. They play vital roles as herbivores, predators, pollinators, decomposers, soil aerators, and as food for other wildlife.

## **History and Dominant Land Use**

Archeological evidence suggests that Native Americans hunted big game in Nebraska around 12,000 years ago. Their cultures slowly evolved over the millinea. They entered and abandoned the central Plains as the climate fluctuated between periods of drought and times of plentiful moisture. During the late 18<sup>th</sup> century, prior to Euro-american settlement, the tribes inhabiting eastern Nebraska were Otoe, Omaha, Ponca, and Pawnee. They lived in earth-lodge villages and cultivated crops, and engaged in bison hunting.

In 1804, the Lewis and Clark expedition mapped what was to become the eastern boundary of Nebraska. In 1812, the St. Louis Missouri Fur Company built a post in present-day Washington County, one of the first Euro-american establishments in Nebraska. Bellevue, founded in 1823, was Nebraska's first permanent settlement. Tens of thousands of people traveled through the area on the Oregon/California Trail during the 1840s and 1850s.

In the early 19<sup>th</sup> century, the Great Plains was generally perceived as an area unfit for agriculture and settlement. The settlement in the tall-grass region began in earnest as a result of the passing of the Homestead Act in 1862. This enabled farmers to settle on 160 acres of free land. By 1900, most prime farmland in eastern Nebraska was settled by inhabitants of European descent. The Native American tribes had been relocated or decimated by disease, and the bison herds were exterminated. Reservations in eastern Nebraska include the Santee Sioux, Omaha, Winnebago and portions of Sac and Fox and Iowa reservations.

The land use changes in Nebraska because of the Homestead Act led to the development of an agriculture-based economy. Major crops grown in the tall-grass region include corn, soybeans, wheat, oats and alfalfa. Nebraska's dairy, pork and poultry industries are located primarily in the eastern portion of the state. Beef cattle production also occurs in the region. The livestock and poultry industries found here are great consumers of the corn, soybeans and other crops, helping to add value to these raw commodities. More recently, a significant proportion of the corn harvest has been used in ethanol production.

In recent decades, Nebraska farms have trended towards becoming fewer in number and larger in size. Since the 1950's, machinery and modern farming methods have made agriculture more efficient, thereby decreasing the number of people employed directly by agriculture. This trend caused rural residents to move to larger communities in search of jobs.

The state's largest urban centers, Lincoln and Omaha are located in the Tallgrass Prairie Ecoregion. Omaha was originally laid out in 1854 by a ferry company and quickly grew into a thriving commercial and cultural center. The eastern terminus of the first trans-continental railroad stimulated its growth. Agriculture also played a role in Omaha's development. Stockyards spurred growth in South Omaha, and by 1893 Omaha housed the nation's third largest stockyards. From these roots, Omaha has steadily grown and is now the 40th largest city and the 59th largest metro area in the nation.

Lincoln is the second largest city in Nebraska. Settlers were attracted to the Lincoln area by the potential industry of salt mining. For a time this was a thriving industry. In sunny weather a crust of salt would form on the ground that could be harvested. The salt mining industry was never fully developed and came to a halt when salt mines were developed in Kansas. When Lincoln was named as the state capitol, the city thrived and it continues to expand today.

## **Nature-based Recreation**

Several of the state's top tourist attractions are outdoors in nature and provide conservation, education and recreation opportunities. The Henry Doorly Zoo sits on 110 acres and offers day camps, Scout programs, and family-friendly activities with a conservation message. The Bill and Berniece Grewcock Center for Conservation and Research provides state of the art medical and research capabilities in animal care and management, reproductive physiology, nutrition, genetics and genome resource banking. The Ak-Sar-Ben Aquarium Outdoor Education Center provides an opportunity to see fish and other wildlife native to Nebraska.

Several state parks and recreation areas offer a plethora of recreation activities that are easily accessible. For example, E.T. Mahoney State Park offers a water playground, hiking, camping and many other activities. Ponca State Park offers activities year round with the Missouri National River Resource and Education Center. At Platte River State Park, you can rent a tepee, go horseback riding and challenge yourself with some of the best mountain biking in eastern Nebraska. Two Rivers State Recreation Area and Branched Oak Recreation Area offer fishing, boating, swimming and hunting.

The tall-grass prairie offers a diversity of hunting opportunities. Quail hunters find greater success south of the Platte River in Johnson and Pawnee counties. Turkeys are abundant along the Missouri River, Platte River, Big Nemaha and Little Blue Rivers. Waterfowl hunting along the Missouri River and its marshy backwaters is some of the best Nebraska has to offer. White-tailed deer can be found throughout the region. The Missouri Bluffs also support an excellent squirrel population.

Wildlife viewing and birding enthusiasts find ample opportunities in this region with the diversity of habitats. This region's prairie-chicken population has been rising steadily in recent years, allowing for a limited hunting season and ample spring viewing opportunities. Fontenelle Forest, Indian Cave State Parks and Schramm State Park have wooded bluffs along the Missouri River that provide habitat for many migrating birds. Some warblers, thrushes, tanagers and other birds are seen almost exclusively in these areas during

migration. Tall-grass prairie remnants, like Nine-Mile Prairie and Spring Creek Prairie, provide opportunities to see grassland nesting birds.

There are opportunities also for canoeing, hiking and biking in this region. The Elkhorn River meanders through hilly areas with steep slopes, woodlands and dense forested areas interspersed with farmland. The Platte River is braided but usually has one deeper, darker channel suitable for canoeing. Sandbars in the river are used by waterfowl and shorebirds. The cowboy trail, Steamboat Trace Trail, MoPac East Trail and Oak Creek Trail all offer hiking and biking opportunities.

The Missouri River has perhaps the greatest untapped potential as a nature-based tourism destination. The ecoregion includes a 59-mile stretch of the un-channelized Missouri River that has been designated as a National Recreation River. The stretch from Gavin's Point Dam to Ponca State Park is used by canoeists but requires caution for navigating. Observers may also appreciate the unique geology of orange and white chalk and gray shale that is often exposed where the river has carved away at the bluffs.

Anglers can enjoy a diversity of fishing opportunities from large rivers to small farm ponds. Missouri River anglers can take advantage of smallmouth bass, walleye, sauger and catfish, which are plentiful in the river. Paddlefish archery in the Missouri River offers a different fishing experience. Trout are found at Grove Lake, Crystal Cove Lake, David City Park Ponds and several other lakes and ponds. Numerous impoundments and prairie streams offer warm-water angling opportunities throughout this region.

Nebraska Scenic Byway encourages travelers to enjoy the journey. The Lewis and Clark Scenic Byway re-traces the path of Lewis and Clark from Omaha to South Sioux City on U.S. Highway 75 where you can see wooded bluffs, open bottomlands, cropland and historic waterways. The Heritage Highway stretches from the Missouri River to south central Nebraska along U.S. Highway 136 and cuts across the land memorialized by Willa Cather. Travelers can enjoy Homestead National Monument of America, where they can visit the second oldest restored prairie. The Outlaw Trail Scenic Byway along Highway 12 begins at South Sioux City and ends in Valentine. Along this route you can observe the transition from forested bluffs to the Sandhills.

Over half of Nebraskans live in the Lincoln and Omaha metropolitan areas. The continuing urbanization of Nebraska has significantly increased demands for both traditional and modern outdoor recreational opportunities in eastern Nebraska. With this in mind, modern amenities and facilities can make nature recreation available to a larger population.

## Education

Environmental education is a tool for sharing philosophies and techniques for improving the environment. Landowners, conservation organizations, school boards, students and teachers are just some of the groups with opportunities for sharing information. There are many existing partners engaged in agriculture education including the Cooperative Extension, which reaches out to agricultural producers and post-secondary education administration to provide curriculum for new professionals on disturbance techniques compatible with agricultural operations. There are many groups working on invasive species, with potential for collaboration including the Nebraska Invasive Species Project, housed at the University of Nebraska at Lincoln, Cooperative Extension, Weed Science Team at the University of Nebraska, Crop Watch publications, Crop Protection Clinics and Pesticide Applicator programs. Landowners are increasingly seeking alternative avenues to support their operations including eco-tourism, hunting, and fishing. There is additional potential to collaborate with partners such as the Nebraska Department of Economic Development to develop education programs.

There are currently at least three private organizations in the Tallgrass Prairie Ecoregion whose principal purpose is environmental education. These include Fontenelle Nature Association in Bellevue, Pioneer Park Nature Center in Lincoln, and Audubon Nebraska's Spring Creek Prairie Education Center near Denton. The region's Natural Resource Districts and state parks, especially Ponca, Mahoney, and Indian Cave are increasingly delivering nature-based education programming.

Education centers at Ponca State Park and the Lewis and Clark Interpretive Center in Nebraska City were constructed to help interpret and celebrate the 200<sup>th</sup> anniversary of the Lewis and Clark expedition. These facilities also help to increase awareness of and appreciation for the Missouri River. The ecoregion also includes two zoos, which provide many learning opportunities. The Folsom's Children's Zoo in Lincoln has an innovative high school that allows students to attend classes at the zoo. The Henry Doorly Zoo in Omaha and the Wildlife Safari near Gretna provide nature-based educational opportunities.

Because Nebraska's two largest school districts exist within the Tallgrass Prairie Ecoregion, there is a critical need for ample environmental education trainings and workshops for educators. There is already some interest in these ecoregion-specific trainings, but more needs to be done to show to both classroom educators and school administrators the need for quality environmental education. Additionally, because numerous colleges and universities are located within this ecoregion, there are great opportunities to train pre-service educators about Nebraska's natural resources, environmental education, and how to incorporate environmental education into their curricula.

## Organizations and Partnerships

The Tallgrass Prairie Ecoregion has partnerships, coalitions and nature centers formed to conserve the region's biodiversity values. Groups include, but are not limited to, the following:

**The Saline Wetlands Conservation Partnership** is focused on a small geographic area, but has significant impact for species conservation. This partnership was formed to address the long-term needs of the saline wetlands, an area of approximately 100 square miles forming a wetland complex in Lancaster and Saunders counties. This partnership consists of nearly 20 partners with 5 full-share partners. The challenge for this partnership was to design conservation objectives that met the needs of the wetland complex and the community. An implementation plan for the conservation of Nebraska's Saline Wetlands was first completed in 2003. The plan goal is "No net loss of saline wetlands and their associated functions with a long-term gain in sustaining wetland functions through the restoration of hydrology, prescribed wetland management and watershed protection."  
[lincoln.ne.gov/city/parks/parksfacilities/wetlands/wetlandspartnership.htm](http://lincoln.ne.gov/city/parks/parksfacilities/wetlands/wetlandspartnership.htm)

**Missouri River Futures** is a collaborative effort primarily between federal and state agencies to 1) improve communications and coordination among the Missouri River National Recreation River (MRNRR) stakeholders, thereby leading to more effective resource conservation through increased understanding of issues and concerns that affect conservation efforts and 2) identify and package an array of land protection and conservation programs that exist among agencies and non-government organizations, and where important, to develop new programs to meet the needs of landowners and others interested in the river's future. The initiation of this group in 2004 was needed since, in the past, organizations and agencies would typically work on similar Missouri River issues individually. Over 40 entities including state and federal agencies, community and local groups have given support to this effort. This group strives to improve effective management of the MRNRR by providing adequate education of the public, local landowners, and other stakeholders in order to facilitate their cooperation and participation in government efforts. Central to this education is making available information on the various programs offered by state and federal agencies.  
[missouririverfutures.com/index.html](http://missouririverfutures.com/index.html)

**Back to the River** began with a planning alliance in 1995 for the Missouri River corridor. The focus area was Omaha and surrounding locations, including parts of Washington, Douglas, and Sarpy counties. The partnership includes local city representatives, city commissioners, NRD managers, educators, Nebraska Game and Parks staff, nature centers, Omaha Parks and Recreation staff, tourism representatives and Iowa Department of Natural Resources. Back to the River envisions a riverfront that is attractive to wildlife and to commerce. The goals of this group are to promote recreation and river access, encourage compatible economic development, emphasize historic and cultural resources, improve wildlife habitat, educate, maintain water quality, and endorse responsible floodplain management.  
[www.backtotheriver.org](http://www.backtotheriver.org)

**The Upper Mississippi River and Great Lakes Region Joint Venture** involves ten states and was established in 1993 in response to the needs of breeding and migrating waterfowl in the northern part of the Mississippi Flyway. The goal of the Joint Venture is to increase populations of waterfowl and other wetland wildlife by protecting, restoring and enhancing wetland and associated habitat. In 2003, a resolution was passed to provide all bird conservation consistent with the North American Bird Conservation Initiative. [uppermissgreatlakesjv.org](http://uppermissgreatlakesjv.org)

## Ecoregion-specific Stresses

### Key Stresses

In addition to the stresses and conservation actions identified in this chapter for the Tallgrass Prairie Ecoregion, statewide concerns are identified also in chapter four. Conservation practitioners identified the following stresses as the top threats in the ecoregion.

Alteration of the frequency and intensity of natural disturbances: Tallgrass prairie, wetland, and forest habitats in the ecoregion were maintained historically by periodic fires and grazing. Today, the loss of fire has resulted in the degradation of thousands of acres of prairie by invasive species including eastern red-cedar. Grazing systems on prairie remnants, involving a higher concentration of grazers on fewer acres, often result in a loss of biodiversity and ecological function because practices do not mirror historical grazing patterns.

Spread of invasive species: Invasive species are severely threatening the ecoregion's biological diversity. Smooth brome, Kentucky bluegrass, reed canary grass, purple loosestrife, Eurasian phragmites, sericea lespedeza, garlic mustard, eastern red-cedar, and other species have competitively excluded native plants and degraded habitat for fish and wildlife. The introduction of carp, zebra mussels, emerald ash borer, feral hogs, and other species have altered habitats and increased competition for native species.

Loss of pollinators: Pollinators are essential to a well-functioning ecosystem. Pollinator habitat restorations can maintain or increase numbers of native pollinators (e.g., bees, moths, butterflies).

Excess deer browsing: Over-browsing by deer can degrade native woodlands and impact agricultural production in areas. Sarcoptic mange has affected many coyotes that would normally prey on deer. A stable predator population and harvest programs (e.g., antlerless deer harvest) can help maintain deer populations at a healthier level.

Altered hydrology and channel degradation of rivers and streams: Historically, the ecoregion's large rivers experienced spikes in flows during the spring and early summer. These spikes enabled sediment to be transported and deposited and for channels to meander and migrate, creating habitats important to many species. Reductions in natural flows have reduced habitat available to fish and other species. Channelization has caused streams to become incised, lowering water tables of adjacent wetlands and affecting plant composition.

Lack of awareness and knowledge about the region's biological diversity and ecological processes: Although the region's remaining native grasslands, woodlands, and wetlands are unique and of high value, most of the ecoregion's residents lack an awareness of the importance of these habitats to biological diversity. For example, individuals may perceive that numerous eastern red-cedars on the landscape are beneficial to all wildlife; when in fact, this particular land cover decreases overall habitat quality. Citizens have limited information and opportunity to learn about the ecoregion's natural communities and fish and wildlife. Private landowners may have a limited understanding of the complex ecological processes that are necessary to maintain biological diversity in the tall-grass region.

Sedimentation of rivers, streams, and wetlands: The close proximity of agricultural fields to rivers, streams, and wetlands has resulted in large volumes of sediment entering the ecoregion's water bodies. Sedimentation increases stream turbidity and changes bottom substrates, degrading habitat for fish and other aquatic species. Sedimentation of wetlands alters storage capacity and changes plant composition, reducing habitat available to waterfowl and other species.

Pollution by pesticides and urban and industrial runoff: The introduction of pesticides, storm sewer runoff, and industrial pollutants into rivers and streams is impacting water quality and exposes fish and other species to harmful agents. The indiscriminate use of herbicides on native habitats reduces plant diversity and overall biological diversity.

Conversion and fragmentation of natural habitats: Although the majority of the ecoregion's natural habitats have already been converted to agriculture, many remaining natural communities are threatened by continued development. Landowners have increasingly diverse goals for natural areas/communities, some of which are not compatible with biodiversity conservation. The expansion of urban areas into surrounding rural communities is accelerating the conversion of prairies, bluff woodlands, and wetlands.

Loss of natural areas because of local economics: Economic hardships are changing ownership patterns that could affect management decisions and ultimate stewardship of the land's natural resources. For example, recreational landowners may plant eastern red-cedar or build structures.

Loss of lands enrolled in conservation programs: Lands enrolled in programs such as the Conservation Reserve Program provide significant benefits to some species of wildlife. Changing economic conditions and reduced support may result in large tracts of conservation lands being converted to agricultural cropland. The loss of even a modest percentage of these lands will result in impacts to terrestrial and aquatic species.

Poorly-sited utility-scale wind turbines: Wind energy development is a growing industry in the Great Plains. There are many benefits to cleaner and renewable energy sources; nevertheless, in order to conserve biodiversity in the ecoregion, it is important to carefully consider the placement of wind turbines and their associated transmission lines in order to minimize wildlife habitat fragmentation. In particular, avoid placing turbines in native grasslands and woodlands or in primary migration corridors for waterfowl, raptors, the federally endangered whooping crane, and other bird species.

## **Biologically Unique Landscapes of the Tallgrass Prairie Ecoregion**

A goal of the Nebraska Natural Legacy Project is to identify priority landscapes that, if properly managed, will conserve the majority of the state's biological diversity. These landscapes, referred to as Biologically Unique Landscapes (BULs), were selected based on the occurrences of at-risk species and natural communities. See Chapter 3 for a description of the methods used to select the landscapes.

The map on the following page shows the BULs for the Tallgrass Prairie Ecoregion. Following the map are brief descriptions of each BUL, including stresses affecting species and habitats, proposed conservation actions, and lists of the Tier I at-risk species and natural communities found in the landscape. In order to help prioritize conservation in each BUL, we denoted species that occur in only one or a few BULs with superscripts.

In the Tallgrass Prairie Ecoregion, some BULs are truncated by the Nebraska state boundary. We suggest opportunities for wildlife conservation in these areas based on review of corresponding adjacent state wildlife action plans.

### **Tallgrass Biologically Unique Landscapes**

Elkhorn Confluence  
 Indian Cave Bluffs  
 Lower Platte River  
 Missouri River  
 Ponca Bluffs  
 Rainwater Basin (see Mixedgrass Prairie Ecoregion for description)  
 Rulo Bluffs  
 Saline Wetlands  
 Sandstone Prairies  
 Southeast Prairies  
 Thurston-Dakota Bluffs  
 Verdigris-Bazile (see Mixedgrass Prairie Ecoregion for description)  
 Willow Creek Prairies

### **Demonstration Sites of the Tallgrass Prairie Ecoregion**

Demonstration sites are locations across the state with potential for showcasing conservation projects and the results of sustainable management to the public. They provide opportunities for learning about the site's unique qualities and importance to at-risk species. See Chapter 4 for information on selecting demonstration sites. The Tallgrass Prairie Ecoregion map shows the location of demonstration sites in the area.

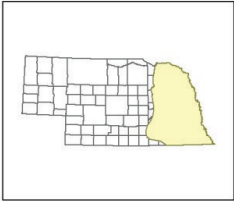
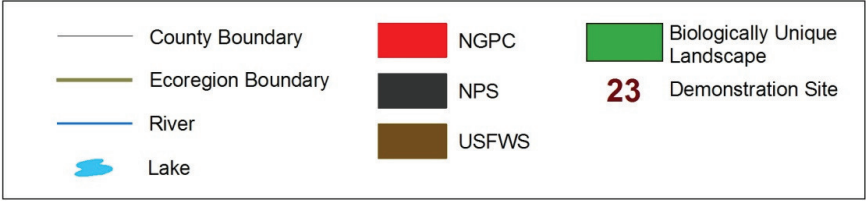
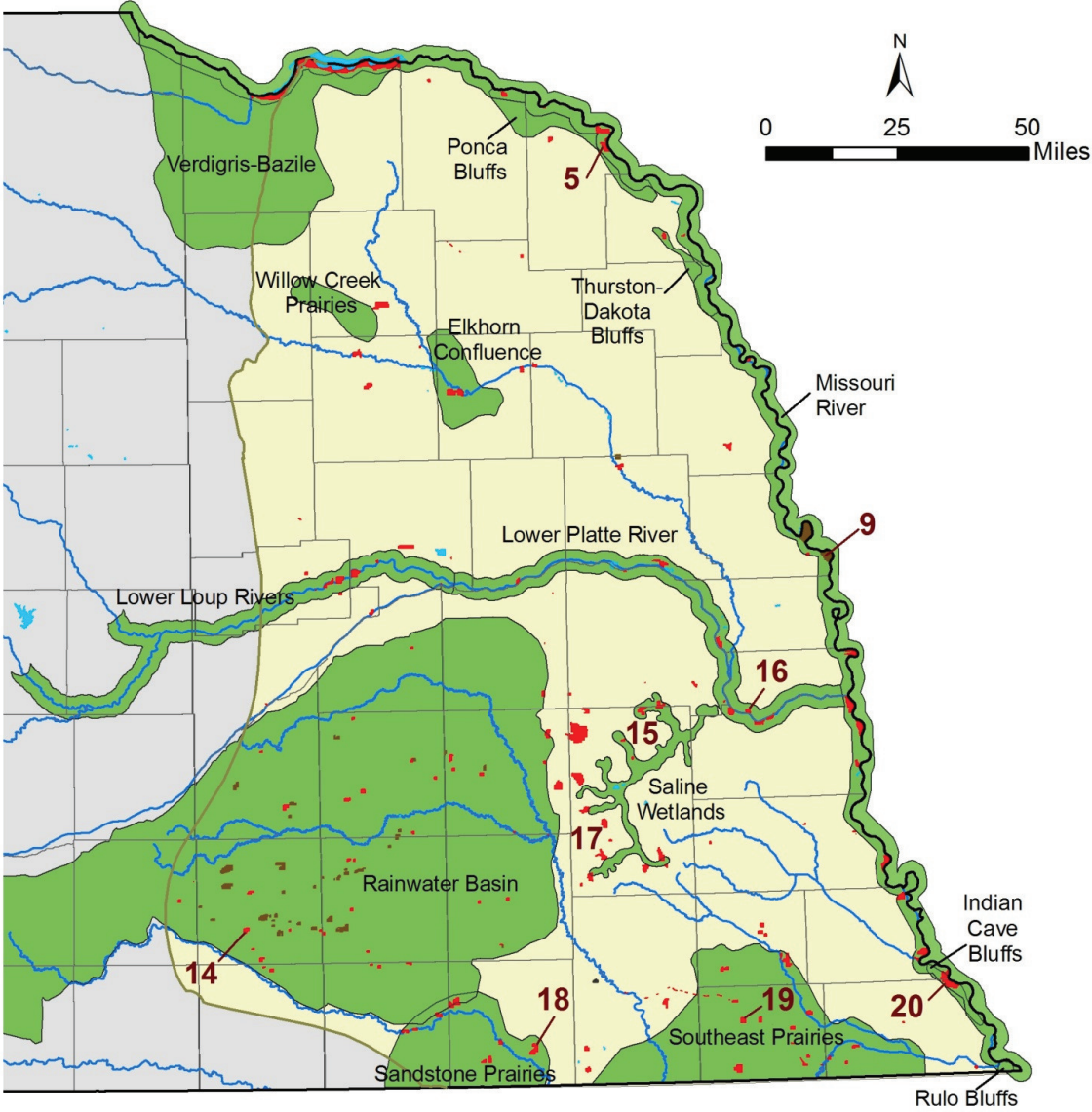
| <u>Site name</u>             | <u># on map</u> | <u>BUL</u>         |
|------------------------------|-----------------|--------------------|
| Boyer Chute NWR              | 9               | Missouri River     |
| Burchard Lake WMA            | 19              | Southeast Prairies |
| Indian Cave SP               | 20              | Indian Cave Bluffs |
| Kissinger Basin WMA          | 14              | Rainwater Basin    |
| Ponca SP                     | 5               | Ponca Bluffs       |
| Rock Glen WMA/Rock Creek SHP | 18              | Sandstone Prairies |
| Saline Wetlands Complex      | 15              | Saline Wetlands    |
| Schramm Park SRA             | 16              | Lower Platte River |
| Spring Creek Prairie         | 17              | N/A                |

Descriptions of each site are found in the write-up for the BUL in which the site is found, except for the Kissinger Basin WMA description which can be found in the Rainwater Basin BUL write-up in Chapter 6 – Mixedgrass Prairie Ecoregion. The Spring Creek Prairie site is not within a BUL and the description is included here.

### **17. Spring Creek Prairie - National Audubon Society**

Spring Creek Prairie is one of the few large tracts of tall-grass prairie within easy driving distance from Lincoln. This 800-acre tall-grass prairie nature preserve has walking trails through tall-grass prairie. This prairie is managed using grazing and prescribed burning. A recently completed education center provides opportunities to the public.

# Nebraska Natural Legacy Project: Tallgrass Prairie Ecoregion



## Elkhorn Confluence

### Biologically Unique Landscape Description

This landscape includes the land around the confluence of the North Fork and South Fork of the Elkhorn River in Stanton County. The Elkhorn River floodplain is primarily cropland, but also contains cottonwood-dominated woodlands, wet meadows and freshwater marshes. The uplands on the south side of the river are composed of sand dunes originating from river alluvium. Dry-mesic sand prairie, mostly grazed, and bur oak woodlands occupy the dunes. Most of the sandy soils south of the river have been converted to cropland. The uplands north of the rivers contain more loam and are mostly in cropland though some degraded tall-grass prairies remain. Wood Duck Wildlife Management Area is the only protected area in the landscape.

### Stresses Affecting Species and Habitats

- ❖ Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure. Heavy grazing has promoted exotic invasion in many grasslands.
- ❖ Conversion of native prairies to cropland
- ❖ Invasive plant species in prairies and woodland, including Siberian elm, eastern red-cedar, smooth brome and garlic mustard
- ❖ Housing development
- ❖ Wetland drainage
- ❖ Increased nutrients in the stream
- ❖ Deer over-browsing

### Conservation Strategies

- ❖ Implement planned grazing strategies on private and public lands to reduce exotic cool-season grasses and improve native plant diversity and vigor. Spring burning and spring grazing, sometimes used in combination, should be implemented as initial management practices to reduce exotic grass dominance. When exotics are under control, other grazing systems can be implemented.
- ❖ Implement tree-clearing programs on private and public lands; these can be done in combination with the prescribed fire and planned grazing
- ❖ Coordinate with landowners interested in using conservation easements to protect high-quality prairies
- ❖ Restore wetland hydrology at important sites
- ❖ Stream-quality monitoring
- ❖ Improved harvest of deer

### Tier I At-risk Species

#### Plants:

None

**Animals:**

Bell's Vireo  
Greater Prairie-Chicken  
Henslow's Sparrow  
Interior Least Tern  
Blanding's Turtle  
Bucholz Black Dash<sup>2</sup>  
Married Underwing  
Whitney Underwing  
Regal Fritillary  
Plains Harvest Mouse  
Plains Pocket Mouse<sup>4</sup>  
Plain Pocketbook<sup>3</sup>

**Aquatic Communities:**

Mid-order, Warm Water River

**Terrestrial Communities:**

Eastern Riparian Forest  
Cottonwood-Peachleaf Willow Riparian Woodland  
Cottonwood-Diamond Willow Woodland  
Sandbar Willow Shrubland  
Riparian Dogwood-False Indigobush Shrubland  
Dry-mesic Bur Oak Forest and Woodland\*  
Freshwater Seep  
Eastern Bulrush Deep Marsh  
Cattail Shallow Marsh  
Reed Marsh  
Eastern Pondweed Aquatic Wetland  
Upland Tall-grass Prairie\*  
Lowland Tall-grass Prairie\*  
Sandhills Dune Prairie  
Perennial Sandbar  
Sandbar/Mudflat

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

## Indian Cave Bluffs

### Biologically Unique Landscape Description

This landscape includes the steep bluffs of the Missouri River in Nemaha and Richardson counties. The majority of the bluffs support an eastern deciduous forest of oaks, hickories and basswood. Because of its location in southeastern Nebraska, these woodlands support a high diversity of eastern deciduous forest plant and animal species. Tall-grass prairie remnants still occur on some bluff tops and south- and west-facing slopes. These have been greatly reduced in size and degraded over the years by shrub and tree encroachment resulting from lack of wildfires. Indian Cave State Park is the only protected area in the landscape.

### Natural Legacy Demonstration Site

#### 20. Indian Cave State Park - Nebraska Game and Parks Commission

This Park is approximately 3300 acres in size. The park is mostly wooded bluffs but is bordered by the Missouri River and includes a recently restored backwater. Natural communities at this park include oak hickory ironwood forest and red oak-basswood-ironwood forest. Park managers are currently working with neighboring landowners to eradicate garlic mustard. The managers improve wildlife habitat through a variety of techniques including prescribed woodland burns.

### Stresses Affecting Species and Habitats

- ❖ Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- ❖ Invasive plant species, including garlic mustard, common buckthorn and other exotic plants.
- ❖ Tree and shrub encroachment of prairie remnants
- ❖ Lack of fire in native woodlands leading to increased tree and shrub densities
- ❖ Housing development and other forms of fragmentation
- ❖ High-grade logging
- ❖ Deer over-browsing in native forests and woodlands
- ❖ Invasive insects, especially the emerald ash borer
- ❖ Poorly-sited utility-scale wind turbines

### Conservation Strategies

- ❖ Conduct annual surveys and implement control programs for garlic mustard, exotic buckthorns and honeysuckles and other invasive woodland plants on conservation lands and adjacent private lands
- ❖ Continued implementation of the Indian Cave State Park management plan including tree and shrub thinning and prescribed fire in park woodlands and invasive species control.
- ❖ Implement prescribed burns in native woodlands to enhance woodland structure, floral composition and oak regeneration on conservation lands and adjacent private lands.

- ❖ Coordinate with landowners interested in conservation easements or voluntary fee title acquisition to protect important habitats from development and commercial logging of mature forests
- ❖ Improved harvest of deer
- ❖ If emerald ash borer occur, remove infected trees and restrict the importation of firewood
- ❖ Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to native species. See Nebraska Game and Parks Commission guidelines for wind energy development.

### **Tier I At-risk Species**

#### **Plants:**

American Ginseng<sup>4</sup>

#### **Animals:**

Southern Flying Squirrel<sup>3</sup>

Cerulean Warbler<sup>4</sup>

Timber Rattlesnake

Wood Thrush

Regal Fritillary

Ghost Tiger Beetle

#### **Aquatic Communities:**

None

#### **Terrestrial Communities:**

Red Oak-Basswood-Ironwood Forest\*

Oak-Hickory-Ironwood Forest\*

Mesic Bur Oak Forest and Woodland\*

Dry-Mesic Bur Oak Forest and Woodland\*

Dry Upland Bur Oak Woodland\*

Freshwater Seep

Upland Tall-grass Prairie

Eastern Sandstone Bluff and Cliff

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

## Lower Platte River

### Biologically Unique Landscape Description

This landscape includes the Platte River channel and its floodplain from the river's confluence with the Loup River in Platte County eastward to its mouth in Sarpy County. The lower Platte River is a large, shallow, braided river. Sandbars and wooded islands are common within the channel. Much of the stream-bank is wooded, with the dominant species being cottonwood and eastern red-cedar. Sand-pits are common along the river, and in many areas the riverbank is lined with cabins. Most of the river floodplain is now cropland, though there are scattered wet meadows and marshes.

The lower Platte River receives water from the Loup and Elkhorn rivers and has a more stable flow than the central Platte River. The lower Platte River is unique in that its sandbars support numerous colonies of the federally and state listed piping plover and interior least terns. The construction of dikes and levees has constricted the natural channel and eliminated or isolated most of the floodplain sloughs, backwaters and wetlands. The narrowing of the channel has resulted in higher flow stages after heavy rain events that wash away tern and plover nests. The lower Platte also supports many rare large river fish including the lake sturgeon, blue sucker, sturgeon chub, and pallid sturgeon. Protected areas along this reach of the Platte River include Two Rivers SRA, Louisville SRA, Platte River State Park, and Mahoney State Park.

### Natural Legacy Demonstration Site

#### 16. Schramm Park State Recreation Area - Nebraska Game and Parks Commission

Schramm Park State Recreational Area is a relatively small but surprisingly biologically-rich area on the lower Platte River. Uplands are covered with oak forest with small patches of prairie. The floodplain has a large area of mature riparian forest. Natural communities at the area include dry-mesic bur oak forest and woodland and upland tall-grass prairie. One of the main needs at this park is cedar tree removal and invasive species management. Limited resources have restricted habitat management.

### Stresses Affecting Species and Habitats

- ❖ Eurasian phragmites and other exotic plant invasion of stream-banks, sandbars, meadows, marshes and woodlands
- ❖ Invasive tree encroachment of woodlands and meadows (e.g., eastern red-cedar)
- ❖ Alteration of natural flows that otherwise would maintain sandbars and fish habitat
- ❖ Dike and levee construction
- ❖ Armoring of stream-banks
- ❖ Water withdrawal
- ❖ Continued cabin and house development adjacent to the river
- ❖ Excessive recreational use of the river (e.g., air boats, 4-wheelers), which disturbs tern and plover nesting

- ❖ Sandpit development, which eliminates native meadows, woodlands, and river channel.
- ❖ Conversion of wet meadows to cropland, including wetland drainage and dewatering resulting from lower groundwater levels
- ❖ Nutrient loading from septic tanks

### **Conservation Strategies**

- ❖ Seek to maintain natural hydrology necessary to sustain ecosystem function and biodiversity
- ❖ Coordinate with landowners interested in placing conservation easements on undeveloped reaches of the river, wet meadows, and woodlands to protect them from development
- ❖ Undertake invasive tree clearing programs, focused on eastern red-cedar, Russian-olive, exotic buckthorns and honeysuckles, on selected stretches of the river to protect woodlands.
- ❖ Work with sand and gravel companies to site gravel pits away from ecologically-sensitive areas of the floodplain and to restore pits to wetland habitat after sand and gravel extraction has been completed
- ❖ Work to restore and maintain natural wetland hydrology
- ❖ Maintain and widen river corridor
- ❖ Install waste management facilities that reduce the number of individual septic tanks

### **Tier I At-risk Species**

#### **Plants:**

Western Prairie Fringed Orchid

#### **Animals:**

Northern River Otter

Bell's Vireo

Interior Least Tern

Piping Plover

Wood Thrush

Blandings Turtle

Massasauga<sup>3</sup>

Blue Sucker<sup>2</sup>

Lake Sturgeon<sup>3</sup>

Pallid Sturgeon<sup>3</sup>

Plains Topminnow

Sturgeon Chub<sup>2</sup>

Pimpleback

Regal Fritillary

Married Underwing

Whitney Underwing

**Aquatic Communities:**

Mid-order, Warm Water River

**Terrestrial Communities:**

Eastern Riparian Forest\*  
 Cottonwood-Peachleaf Willow Riparian Woodland\*  
 Red Oak-Basswood-Ironwood Forest  
 Oak-Hickory-Ironwood Forest  
 Mesic Bur Oak Forest and Woodland\*  
 Dry-Mesic Bur Oak Forest and Woodland\*  
 Dry Upland Bur Oak Woodland\*  
 Sandbar Willow Shrubland  
 Riparian Dogwood-False Indigobush Shrubland  
 Freshwater Seep  
 Eastern Cordgrass Wet Prairie\*  
 Eastern Sedge Wet Meadow\*  
 Eastern Bulrush Deep Marsh  
 Reed Marsh  
 Eastern Pondweed Aquatic Wetland  
 Upland Tall-grass Prairie  
 Lowland Tall-grass Prairie\*  
 Perennial Sandbar\*  
 Sandbar/Mudflat  
 Eastern Sandstone Bluff and Cliff

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

## Missouri River

### Biologically Unique Landscape Description

This landscape includes the Missouri River channel, floodplain, and bluffs from the Nebraska/Kansas border to the Nebraska/South Dakota border. The Missouri River drains approximately 529,350 square miles of land, including the entire state of Nebraska. Historically, the Missouri was one of the most dynamic large rivers in North America. Natural runoff events (floods) in March - June were instrumental in creating the river's constantly meandering course. The River was more than a mile wide and 20 feet deep in places, and its channel laced with sandbars and forested islands. The river's floodplain was a mosaic of oxbow lakes, backwater marshes, wet prairies and floodplain forests.

Alteration of the Missouri River began in 1829 when the removal of tree snags was initiated to improve steamboat navigation. Between the 1930's and 1960's, a bank stabilization

project armored the banks and created a navigational channel between St. Louis, Missouri and Sioux City, Iowa. Between 1940 and 1964, six mainstream dams were constructed, which resulted in managed flows.

From an ecological perspective, these attempts to “tame the river” have had many negative consequences for riverine flora and fauna. Sediment transport has been interrupted, resulting in increased sedimentation above Gavins Point Dam and degradation of the streambed and draining of floodplain wetlands below the dam. Channelization has resulted in the elimination of sloughs, backwaters and oxbows. Many riverine species depend upon spring flood pulses as spawning cues and upon the availability of floodplain habitat for many of their life requisites. Alteration of natural flows and elimination of lateral riverine movement has resulted in declining populations of many big river species. There are nine state-listed species and five federally-listed species that occur within the Nebraska portion of the Missouri River corridor. The lack of properly-timed flows has also impacted the hydrology of the floodplain wetlands. The majority of the floodplain is now in cropland.

The stretches of the Missouri River from Sioux City to Gavins Point Dam and from the upper end of Lewis and Clark Lake to the South Dakota border have remained un-channelized and are designated as a National Recreational River. Although these reaches remain un-channelized, regulated flows have altered many natural riverine processes (e.g., sediment transport, annual flooding).

Federal mitigation dollars have helped fund several chute and channel restoration projects on the Missouri River in recent years, such as the Hamburg Bend, Kansas Bend, Langdon Bend, Decatur Bend and Tobacco Bend projects. In addition, Wetland Reserve Program dollars have become available for the restoration of Missouri River floodplain wetlands and associated habitats. The U.S. Army Corps of Engineers has worked to create new sand islands for least tern and piping plover nesting. A backwater area called Mulberry Bend was enhanced by removal of sediment for island creation. South Dakota Game, Fish and Parks (SDGFP) recently completed an evaluation of impacts to native fishes in this aquatic habitat. Protected areas in the BUL include Niobrara, Ponca, and Indian Cave State Parks, Boyer Chute National Wildlife Refuge, and a number of wildlife management areas.

## **Natural Legacy Demonstration Site**

### **9. Boyer Chute National Wildlife Refuge - U.S. Fish and Wildlife Service**

This Refuge was established to recover fish and wildlife habitat in the Missouri River and its floodplain. Refuge floodplains have been restored to near pre-channelization condition without affecting navigation on the main stem of the Missouri River. Boyer Chute is once again an ecologically-functioning part of the river. Close to 3,350 acres of floodplain woodland, tall-grass prairie, and wetland habitats now benefit Missouri River fishes, migratory birds, endangered species, and resident wildlife.

### **Stresses Affecting Species and Habitats**

- ❖ Invasive plants and animals, including phragmites, reed canary grass, purple loosestrife, zebra mussels and exotic fish
- ❖ Altered natural flows will continue to threaten at-risk aquatic species, as well as some terrestrial species whose life-histories are closely linked to the availability of riverine habitat
- ❖ Channel down-cutting from lack of sediment, restricted channel, and constructed jetties.
- ❖ Wetland drainage and conversion
- ❖ Development pressure in riparian zones
- ❖ Deer over-browsing in riparian woodlands
- ❖ Chemicals in the water that work as endocrine disrupters in fish species

### **Conservation Strategies**

- ❖ Seek to alter river flow management to conform to more natural flows
- ❖ Encourage levee setbacks and a functional connected floodplain according to the Galloway Plan (IFMRC 1994) and the National Research Council Report (2002)
- ❖ Restore river meandering where possible, restore meandering in off-channel chutes especially, reduce navigation channel where possible
- ❖ Restore sediment availability for river reaches downstream of Fort Randall Dam. Develop an erodible corridor for sediment input.
- ❖ Restore coarse particulate organic matter and large woody debris in the river
- ❖ Increase top width of the channelized reach in order to establish shallow water habitat diversity for fish and wildlife purposes
- ❖ Uphold wetland conservation provisions (e.g., Swampbuster) and studies that evaluate the abilities of aquatic wildlife to pass through dams
- ❖ Restore natural plant communities (e.g., wetlands, prairies, and woodlands) on the river floodplain and terraces
- ❖ Conduct education programs on invasive aquatic species identification, prevention, and inadvertent transfer.
- ❖ Establish zoning setbacks and possible land purchases to reduce fragmentation of riparian habitat
- ❖ Improved harvest of deer
- ❖ Use integrated pest management and nutrient management to reduce pollution run-off into tributaries

### **Collaborative Conservation Opportunities across State Borders**

Coordinate with South Dakota, Iowa, and Missouri conservation agencies and tribes, particularly efforts to benefit riverine species of the Missouri River in greatest conservation need (identified in multiple state wildlife action plans). Nebraska at-risk species identified also in the South Dakota wildlife action plan include river otter, bald eagle, interior least tern, piping plover, pallid sturgeon, sicklefin chub, sturgeon chub, Higgins eye, and scaleshell. Nebraska at-risk species identified also in the Iowa wildlife action plan include river otter, southern flying squirrel, bald eagle, Bell's vireo, cerulean warbler, interior least tern, king rail, piping plover, timber rattlesnake, blue sucker, lake sturgeon, pallid sturgeon, and sicklefin chub. And, species identified also in the Missouri strategy include Bell's vireo,

cerulean warbler, king rail, timber rattlesnake, blue sucker, pallid sturgeon, and sturgeon chub. Species lists may be modified as new information becomes available. Innovative methods for sufficient information exchange could aid the collaborative process.

Coordinated habitat management actions (e.g., strategic grazing) should mirror medium to high priority conservation goals as identified in the South Dakota Comprehensive Wildlife Conservation Plan, priorities for conservation actions in the Iowa Wildlife Action Plan, and/or actions in the Missouri Comprehensive Wildlife Strategy. Collaborative conservation efforts across state borders should include researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. For example, conservation efforts coordinated by Missouri River Futures involve multi-state partners to address current issues regarding the Missouri River. South Dakota Game, Fish and Parks, Nebraska Game and Parks Commission, Iowa Department of Natural Resources, and the South Dakota, Iowa, and Nebraska Divisions of the Izaak Walton League of America (IWLA) formed the Tri-state IWLA Missouri River Initiative to work towards stated goals. Additionally, USDA programs may have goals in common with Natural Legacy. NRCS Conservation Innovation Grants are already contributing to multi-state conservation efforts regarding various issues.

### **Tier I At-risk Species**

#### **Plants:**

American Ginseng<sup>4</sup>  
Nodding-pogonia<sup>2</sup>

#### **Animals:**

Northern River Otter  
Southern Flying Squirrel<sup>3</sup>  
Bell's Vireo  
Cerulean Warbler<sup>4</sup>  
Interior Least Tern  
Piping Plover  
Timber Rattlesnake  
Blue Sucker<sup>2</sup>  
Lake Sturgeon<sup>3</sup>  
Pallid Sturgeon<sup>3</sup>  
Sicklefin Chub<sup>1</sup>  
Sturgeon Chub<sup>2</sup>  
Flat Floater<sup>1</sup>  
Higgins Eye<sup>1</sup>  
Pistolgrip<sup>2</sup>  
Scaleshell<sup>1</sup>  
Regal Fritillary  
Mottled Duskywing<sup>4</sup>  
Married Underwing  
Whitney Underwing

**Aquatic Communities:**

Large, Warm Water River\*

**Terrestrial Communities:**

Eastern Riparian Forest

Cottonwood-Peachleaf Willow Riparian Woodland\*

Eastern Cottonwood-Dogwood Riparian Woodland\*

Cottonwood-Diamond Willow Woodland

Red Oak-Basswood-Ironwood Forest

Oak-Hickory-Ironwood Forest

Bur Oak-Basswood-Ironwood Forest

Mesic Bur Oak Forest and Woodland

Dry-Mesic Bur Oak Forest and Woodland

Dry Upland Bur Oak Woodland

Sandbar Willow Shrubland\*

Riparian Dogwood-False Indigobush Shrubland\*

Buffaloberry Shrubland

Freshwater Seep

Eastern Cordgrass Wet Prairie\*

Eastern Sedge Wet Meadow\*

Eastern Bulrush Deep Marsh\*

Cattail Shallow Marsh\*

Reed Marsh\*

Eastern Pondweed Aquatic Wetland\*

American Lotus Aquatic Wetland\*

Upland Tall-grass Prairie

Lowland Tall-grass Prairie

Missouri River Valley Dune Grassland\*

Missouri River Floodplain Terrace Grassland\*

Northern Loess/Shale Bluff Prairie\*

Perennial Sandbar

Sandbar/Mudflat\*

Eastern Sandstone Bluff and Cliff

Northern Chalk Bluff and Cliff

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

## **Ponca Bluffs**

### **Biologically Unique Landscape Description**

This landscape includes the steep bluffs of the Missouri along the un-channelized Missouri River in Dakota, Dixon, and Cedar counties. This reach of the Missouri River has been designated as a National Recreational River. The majority of the bluffs support eastern deciduous forest dominated by bur oak, basswood and ironwood. Remnants of tall-grass prairie and northern loess shale bluff occur on the bluffs. Cropland is scattered on rolling hills throughout the landscape. Ponca State Park is the largest protected area in the landscape.

### **Natural Legacy Demonstration Site**

#### **5. Ponca State Park - Nebraska Game and Parks Commission**

Ponca State Park contains 1900 acres and includes the steep bluffs covered in hardwood forest and floodplains of the un-channelized Missouri River. Ponca State Park is located in the portion of the Missouri River designated as a National Recreational River. Restored sandbars in the Missouri River and backwater provide habitat for several listed species, while allowing the channel to meander restores the dynamic floodplain. This park has bur oak basswood-ironwood forest, dry-mesic bur oak forest and woodland, and upland tall-grass prairie.

### **Stresses Affecting Species and Habitats**

- ❖ Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- ❖ Invasive plant species in native woodlands by eastern red-cedar, garlic mustard, common buckthorn, leafy spurge and exotic plants
- ❖ Tree and shrub encroachment of prairie remnants
- ❖ Housing development and other forms of fragmentation
- ❖ High-grade logging of woodlands
- ❖ Excess deer browsing
- ❖ Poorly-sited utility-scale wind turbines

### **Conservation Strategies**

- ❖ Implement ecologically-sensitive planned grazing and prescribed fire strategies in native grasslands on private lands
- ❖ Conduct annual surveys and implement control programs on conservation lands and nearby private lands for garlic mustard, common buckthorn and other invasive woodland plants.
- ❖ Coordinate with landowners interested in using conservation easements and voluntary fee title acquisition to protect important habitats from development and commercial logging of mature forests
- ❖ Continue implementation of the Ponca State Park management plan including tree and shrub thinning in park woodlands, implementation of prescribed fire, and restoration of native grasslands and wetlands within the floodplain
- ❖ Improved harvest of deer

- ❖ Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to native species. Avoid placing wind turbines and transmission lines in native plant communities and on bluff tops where they contribute to higher bird and bat mortality. Wind farms should not be located within the recommended radius of prairie grouse leks and nesting grounds. Turbines can be halted temporarily during peak migration periods for bats and birds. Pre- and post-construction monitoring should be implemented. See Nebraska Game and Parks Commission guidelines for wind energy development.

### **Collaborative Conservation Opportunities across State Borders**

Coordinate with South Dakota organizations, particularly efforts to benefit shared species of greatest conservation need on the NE Ponca Bluffs/SD Missouri River Ecoregion border (i.e., Union, Clay, and Yankton Counties in SD). Identified species include bald eagle, interior least tern, piping plover, and regal fritillary. Species lists may be modified as new information becomes available. For example, South Dakota Game, Fish and Parks completed an osprey reintroduction project along the lower Missouri River in Clay and Yankton counties in 2010. Several nesting platforms were placed in the reintroduction area below Gavins Point Dam to encourage new nesting pairs. It is likely that new nesting pairs may breed in Nebraska or South Dakota.

Coordinated habitat management actions (e.g., strategic grazing) should mirror medium to high priority conservation goals as identified in the South Dakota Comprehensive Wildlife Conservation Plan. Collaborative conservation across state borders should include researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. It will be necessary to identify and develop staffing and funding sources for implementation of conservation actions beyond state boundaries.

### **Tier I At-risk Species**

#### **Plants:**

American Ginseng<sup>4</sup>

#### **Animals:**

Bell's Vireo

Greater Prairie-Chicken

Wood Thrush

Regal Fritillary

#### **Aquatic Communities:**

None

#### **Terrestrial Communities:**

Bur Oak-Basswood-Ironwood Forest\*

Dry-Mesic Bur Oak Forest and Woodland\*

Dry Upland Bur Oak Woodland\*

Freshwater Seep  
 Upland Tall-grass Prairie\*  
 Northern Loess/Shale Bluff Prairie\*  
 Eastern Sandstone Bluff and Cliff\*

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

## Rulo Bluffs

### Biologically Unique Landscape Description

This landscape includes the steep bluffs of the Missouri River in the far southeast corner of the state. The majority of the bluffs support eastern deciduous forest of oaks, hickories and basswood. Because of its location in extreme southeastern Nebraska, this landscape has a high diversity of eastern deciduous forest plant and animal species. Tallgrass prairie remnants occur on some bluff tops and south- and west-facing slopes. These have been reduced in size and degraded over the years by shrub and tree encroachment resulting from lack of wildfires. Scattered cropland and pastureland occur in the landscape. Some areas of woodland have been farmed or logged in the past. The Nature Conservancy's Rulo Bluffs Preserve is a high-quality protected area in the landscape.

### Stresses Affecting Species and Habitats

- ❖ Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- ❖ Invasive woodland plant species, including garlic mustard, common buckthorn and other exotic plants, as well as increased density of shrubs in the forest understory
- ❖ Tree and shrub encroachment of prairie remnants.
- ❖ Invasive insects, especially the emerald ash borer is a potential threat
- ❖ Housing development and other forms of fragmentation
- ❖ High-grade logging
- ❖ Excess deer browsing
- ❖ Utility-scale wind energy developments

### Conservation Strategies

- ❖ Promote ecologically-sensitive grazing strategies.
- ❖ Conduct annual surveys for garlic mustard and other invasive woodland plants and implement control strategies, especially on conservations lands and adjacent private lands
- ❖ If emerald ash borer infestations occur, remove infected trees and restrict the importation of firewood

- ❖ Coordinate with landowners interested in using conservation easements or voluntary fee title acquisition to protect important habitats from development and commercial logging of mature forests
- ❖ Offer voluntary financial incentives to private landowners to implement tree and shrub thinning and prescribed burning within high-quality native woodlands
- ❖ Improved harvest of deer
- ❖ Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to native species. See Nebraska Game and Parks Commission guidelines for wind energy development.
- ❖ Provide education about woodland/forest ecology

### **Collaborative Conservation Opportunities across State Borders**

Coordinate with Kansas and Missouri organizations, particularly efforts to benefit shared species of greatest conservation need on NE Rulo Bluffs/KS Eastern Tallgrass Prairie Conservation Region/MO Central Dissected Till Plains borders, especially forest and woodland (i.e., Brown County in KS and Holt County in MO). Nebraska Tier I at-risk species identified also in the Kansas wildlife action plan include southern flying squirrel, cerulean warbler, and timber rattlesnake. And, Tier I Nebraska species identified also in the Missouri strategy include cerulean warbler and timber rattlesnake. Species lists may be modified as new information becomes available. Innovative methods for sufficient information exchange could aid the collaborative process.

Coordinated wildlife management actions (e.g., invasive species management, wildlife corridor development) should mirror strategies identified in Kansas' Comprehensive Wildlife Conservation Plan and/or actions in the Missouri Comprehensive Wildlife Strategy. Collaborative conservation efforts across state borders should include researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. It will be necessary to identify and develop staffing and funding sources for implementation of conservation actions beyond state boundaries.

### **Tier I At-risk Species**

#### **Plants:**

American Ginseng<sup>4</sup>  
Nodding Pogonia<sup>2</sup>

#### **Animals:**

Southern Flying Squirrel<sup>3</sup>  
Cerulean Warbler<sup>4</sup>  
Wood Thrush  
Regal Fritillary  
Timber Rattlesnake

#### **Aquatic Communities:**

None

**Terrestrial Communities:**

Red Oak-Basswood-Ironwood Forest\*  
 Oak-Hickory-Ironwood Forest\*  
 Mesic Bur Oak Forest and Woodland\*  
 Dry-Mesic Bur Oak Forest and Woodland\*  
 Dry Upland Bur Oak Woodland  
 Freshwater Seep  
 Upland Tall-grass Prairie\*  
 Eastern Sandstone Bluff and Cliff\*

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

**Saline Wetlands****Biologically Unique Landscape Description**

This landscape includes the saline wetlands that occur in the floodplains of Salt Creek, Little Salt Creek and Rock Creek and surrounding uplands. The wetlands' salinity is derived from deeply buried salts brought to the soil surface through artesian groundwater flow. The marshes' vegetation is dominated by salt-tolerant species such as saltgrass, sea-blite, and saltwort. The majority of the uplands surrounding the marshes are in cropland, though there are a few tall-grass prairie remnants. Commercial and residential development is common in the landscape.

This landscape is significant in that it includes Nebraska's only saline wetland complex. Over 90 percent of the original saline wetlands within this landscape have been lost or highly degraded. The most viable remaining marshes occur in the two core areas in the upper reaches of the Little Salt Creek valley near Raymond and the Rock Creek valley near Ceresco. The Little Salt Creek wetlands contain the world's only known populations of the Salt Creek tiger beetle. This species is listed as state and federally endangered. The saline wetlands also contain the state's only known populations of the state-listed saltwort. Several protected areas occur within this landscape including Arbor Lake, Little Salt Creek, and Jack Sinn Wildlife Management Areas, the City of Lincoln's Shoemaker Marsh, Anderson Tract, and King Tract, the Lower Platte South NRD's Lincoln Saline Wetland Nature Center and Warner Wetland, and The Nature Conservancy's Little Salt Fork Marsh.

The Saline Wetlands Conservation Partnership has developed the *Implementation Plan for the Conservation of Nebraska's Eastern Wetlands*. The plan's goal is "no net loss of saline wetlands and their associated functions with a long-term gain in sustaining wetland functions through the restoration of hydrology, prescribed wetland management, and watershed protection." The plan has identified three categories of saline wetlands with Category 1 wetlands being of the highest quality.

## Natural Legacy Demonstration Site

### 15. Saline Wetland Complex

The Saline Wetland Complex includes Jack Sinn WMA (NGPC), Arbor Lake (City of Lincoln), Whitehead Saline Wetlands (Lower Platte South NRD) and Frank Shoemaker Marsh (City of Lincoln). Eastern saline wetlands are considered critically imperiled. These locations have restored wetlands and habitat for listed species. Natural communities at this location include Eastern saline meadow and Eastern saline marsh. The Saline Wetland Conservation Partnership has been fundamental in facilitating collaboration between local entities to restore the few remaining saline wetlands.

### Stresses Affecting Species and Habitats

- ❖ Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- ❖ Invasive plant species, including reed canary grass and narrow-leaf cattail, with some Eurasian phragmites and saltcedar
- ❖ Urban and residential development
- ❖ Light pollution which may adversely impact Salt Creek tiger beetles
- ❖ Down-cutting of streams leading to decline in groundwater levels, loss of salts from the wetlands, and general alteration of wetland hydrology
- ❖ Wetland drainage and sedimentation
- ❖ Conversion of saline wetlands to freshwater wetlands
- ❖ Poorly-sited utility-scale wind turbines

### Conservation Strategies

- ❖ Protect high-quality wetlands through use of conservation easements or voluntary fee title acquisition. The wetlands in need of protection have been prioritized by the Saline Wetland Conservation Partnership, along with identifying strategies for their protection. Priority should be given to the saline wetland complexes in the upper reaches of Little Salt Creek near TNC's Little Salt Fork Marsh and those on Rock Creek near Jack Sinn WMA where stream down-cutting is still manageable.
- ❖ Protect uplands in the watersheds surrounding these wetlands from development through use of conservation easements or other protection measures
- ❖ Use in-channel structures and restore natural meanders, where feasible, to stop stream down-cutting and subsequent head-cutting into wetlands
- ❖ Channel storm-water away from saline wetlands in urban areas.
- ❖ Reduce and prevent the number of wells that lower hydrologic pressure or interrupt the hydrologic system needed for saline ecology
- ❖ Continue stream and wetland water-quality monitoring programs
- ❖ Develop and implement plans to control reed canary grass and narrow-leaf cattail in saline wetlands, especially on conservation lands
- ❖ Intensify management (e.g., prescribed fire and planned grazing) on conservation lands and private lands to improve the quality of saline wetlands
- ❖ Remap saline plant communities within the BUL and conduct studies to investigate saline soil properties

- ❖ Work with developers to increase use of cluster development in areas surrounding saline wetlands, protecting even very small saline habitats
- ❖ Develop and implement methods to restore the hydrology of saline wetlands
- ❖ Evaluate and possibly implement stream-bank pull-backs to improve Salt Creek tiger beetle habitat
- ❖ Work with the City of Lincoln and developers to reduce light pollution near saline wetlands (monitor and review city lighting ordinance)
- ❖ This landscape should be restricted from wind turbine development as it has been recognized as critical habitat to the federally endangered Salt Creek tiger beetle. The effects of development and run-off from site construction could be a threat to the beetle.

### **Tier I At-risk Species**

#### **Plants:**

Saltwort<sup>1</sup>

#### **Animals:**

Bell's Vireo

Regal Fritillary

Salt Creek Tiger Beetle<sup>1</sup>

Plains Harvest Mouse

Pimpleback

#### **Aquatic Communities:**

Headwater, Warm Water Stream

#### **Terrestrial Communities**

Sandbar Willow Shrubland

Freshwater Seep

Eastern Saline Meadow\*

Cattail Shallow Marsh

Eastern Saline Marsh\*

Saline/Alkaline Aquatic Wetland\*

Upland Tall-grass Prairie

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

## **Sandstone Prairies**

### **Biologically Unique Landscape Description**

This landscape includes the bluffs and breaks along the Little Blue River and Rose Creek in Jefferson and Thayer counties. The soils in some parts of the area are shallow and derived from sandstone, with limited agricultural development in many areas. Large blocks of native tall-grass prairie still remain. These prairies are often interspersed with cropland. Many of the prairies have been disturbed from past grazing practices and invasive cool-season grasses. Eastern red-cedar and invasive deciduous trees are problematic in many areas. Bur oak woodlands occur in many of the drainage bottoms. Prairie fens occur occasionally in canyon bottoms and on side slopes.

The landscape contains some of the last remaining populations of the massasauga and timber rattlesnakes in the state. Even though many of the prairies are degraded, the large size of prairie remnants makes this area unique and provides an opportunity for landscape-scale tall-grass prairie conservation. The largest protected areas in the landscape include Rock Glen WMA, Rose Creek WMA, and Rock Creek Station State Historical Park.

### **Natural Legacy Demonstration Site**

#### **18. Rock Glen Wildlife Management Area and Rock Creek Station State Historical Park - Nebraska Game and Parks Commission**

Rock Creek Station State Historical Park includes 350 acres with a high proportion of native vegetation. Uplands are covered with both oak woodland and tall-grass prairie. Riparian forest occurs along Rock Creek. The nearby Rock Glenn WMA includes 706 acres of rolling native upland and tree-lined drainages. Eastern red-cedar is a primary threat, so thinning in conjunction with burning and grazing are the primary conservation actions.

### **Stresses Affecting Species and Habitats**

- ❖ Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- ❖ Conversion of native prairies to cropland and other uses
- ❖ Lack of fire has led to invasive tree encroachment in prairies and woodlands (e.g., honey locust, eastern red-cedar, osage orange)
- ❖ Exotic herbaceous plant invasion. In prairies, heavy grazing and annual mid-summer haying promotes exotic invasion.
- ❖ Housing development and fragmentation of habitat
- ❖ Agricultural run-off into streams
- ❖ Streambed degradation
- ❖ Clay mining for bricks in restricted areas.
- ❖ Poorly-sited utility-scale wind turbines

### **Conservation Strategies**

- ❖ Implement invasive tree clearing programs on grasslands on conservation and private lands in conjunction with prescribed fire and planned grazing

- ❖ Conduct annual surveys for invasive plants in woodlands and prairies, especially on public lands
- ❖ Develop and implement control programs for garlic mustard, sericea lespedeza, and other invasive exotic species
- ❖ Protect priority streams from siltation and contaminants using methods such as stream buffers and grass waterways. Address water quality problems with watershed planning.
- ❖ Coordinate with landowners interested in using conservation easements or voluntary fee title acquisition to protect high-quality prairies
- ❖ Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to native species. Wind farms should not be located within the recommended radius of prairie grouse leks and nesting grounds. Turbines can be halted temporarily during peak migration periods for bats and birds. Pre- and post-construction monitoring should be implemented. See Nebraska Game and Parks Commission guidelines for wind energy development.

### **Collaborative Conservation Opportunities across State Borders**

Coordinate with Kansas organizations, particularly efforts to benefit like species of greatest conservation need on NE Sandstone Prairie/KS Eastern Tallgrass Prairie Conservation Region border (i.e., Republic and Washington Counties in KS). Nebraska Tier I at-risk species identified also in the Kansas wildlife action plan include greater prairie-chicken, Henslow's sparrow, massasauga, timber rattlesnake, Arogos skipper, and Ottoe skipper. Species lists may be modified as new information becomes available. Innovative methods for sufficient information exchange could aid the collaborative process.

Coordinated wildlife management actions (e.g., invasive species management, wildlife surveys) should mirror strategies identified in Kansas' Comprehensive Wildlife Conservation Plan. Collaborative conservation efforts across state borders should include researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. It will be necessary to identify and develop staffing and funding sources for implementation of conservation actions beyond state boundaries.

### **Tier I At-risk Species**

#### **Plants:**

None

#### **Animals:**

Greater Prairie-Chicken  
 Henslow's Sparrow  
 Loggerhead Shrike  
 Massasauga<sup>3</sup>  
 Timber Rattlesnake  
 Iowa Skipper  
 Ottoe Skipper

Regal Fritillary  
Married Underwing  
Whitney Underwing  
Pimpleback  
Plains Harvest Mouse

**Aquatic Communities:**

Headwater, Warm Water Stream  
Mid-order, Warm Water River

**Terrestrial Communities:**

Cottonwood-Peachleaf Willow Riparian Woodland  
Sandstone Upland Bur Oak Woodland\*  
Sandbar Willow Shrubland  
Riparian Dogwood-False Indigobush Shrubland  
Freshwater Seep\*  
Prairie Fen\*  
Eastern Cordgrass Wet Prairie  
Eastern Sedge Wet Meadow  
Eastern Bulrush Deep Marsh  
Cattail Shallow Marsh  
Upland Tall-grass Prairie\*  
Dakota Sandstone Tall-grass Prairie\*  
Lowland Tall-grass Prairie  
Southern Sand/Gravel Prairie\*  
Perennial Sandbar  
Sandbar/Mudflat  
Eastern Sandstone Bluff and Cliff\*

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

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## **Southeast Prairies**

### **Biologically Unique Landscape Description**

This landscape includes the rolling hills of western Richardson, Pawnee, southern Johnson, and southern Gage counties. The landcover is primarily cropland, but there are also many tall-grass prairie remnants dominated by big bluestem and Indian grass and reseeded native and exotic grasses. The native prairies are of two types: hay meadows and grazed pastures. The hay meadows are generally in better ecological condition. The Big Nemaha River drains the eastern portion of the region while the Big Blue River drains the western portion of the region. Eastern deciduous woodlands are found along the bluffs and floodplains of these

streams and their tributaries. The larger streams in the area have highly incised stream channels, though several smaller higher quality streams, including Wildcat, Turkey, Rock, and Yankee creeks, still remain.

The abundance of native and restored grasslands in the regions supports a stable population of greater prairie-chickens and other grassland birds. Burchard Lake WMA and Pawnee Prairie WMA areas are the largest protected areas in the landscape. These areas are strongholds for the largest remaining massasauga populations in Nebraska. The Barneston Bluff area in Gage County on the Big Blue River contains rocky woodlands, which support populations of timber rattlesnakes and copperheads.

## **Natural Legacy Demonstration Site**

### **19. Burchard Lake Wildlife Management Area - Nebraska Game and Parks Commission**

Burchard Lake WMA contains 560 acres, with a 150-acre reservoir, surrounded by native grasslands and hardwoods. The upland tall-grass prairie here is managed for a variety of species through prescribed fire and patch-burn grazing. There are greater prairie-chickens and two permanent blinds that are used to view the lek. Henslow's sparrows and massasauga benefit from land management practices.

### **Stresses Affecting Species and Habitats**

- ❖ Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- ❖ Lack of fire has led to invasive tree encroachment, primarily Osage orange, honey locust, and eastern red-cedar in prairies and woodlands and exotic herbaceous plant invasion, primarily sericea lespedeza, crown vetch, old world bluestem, and smooth brome in prairies and garlic mustard in woodlands
- ❖ Invasion of Eurasian phragmites in riverine environments
- ❖ Conversion of native prairies to cropland
- ❖ Agricultural chemical and sediment run-off into streams
- ❖ Streambed degradation
- ❖ Mining of rare metals could become a threat in the near future
- ❖ Poorly-sited utility-scale wind turbines

### **Conservation Strategies**

- ❖ Implement invasive tree clearing programs on conservation lands and private lands in conjunction with prescribed fire and planned grazing
- ❖ Conduct annual surveys and implement control programs for garlic mustard, sericea lespedeza and old world bluestem with a concerted effort on conservation lands
- ❖ Identify and protect priority streams from siltation and contaminants
- ❖ Coordinate with landowners interested in using conservation easements and voluntary fee title acquisition to protect high-quality prairies and establish riparian buffer strips
- ❖ Implement integrated public and private lands management. For example, work with private landowners with properties bordering WMAs to manage larger habitat blocks

- ❖ Work with mining and energy companies to choose development sites that avoid native plant communities and avoid impacts to important native wildlife habitat

### **Collaborative Conservation Opportunities across State Borders**

Coordinate with Kansas organizations, particularly efforts to benefit like species of greatest conservation need on NE Southeast Prairie/KS Eastern Tallgrass Prairie Conservation Region border (i.e., Marshall, Nemaha, and Brown Counties in KS). Nebraska Tier I at-risk species identified also in the Kansas wildlife action plan include greater prairie-chicken, Henslow's sparrow, massasauga, timber rattlesnake, regal fritillary, pistolgrip, plain pocketbook, pondmussel, and threeridge. Species lists may be modified as new information becomes available. Methods for sufficient information exchange could aid the collaborative process.

Coordinated wildlife management actions (e.g., prairie restoration and rehabilitation) should mirror strategies identified in Kansas' Comprehensive Wildlife Conservation Plan.

Collaborative conservation efforts across state borders should include researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. It will be necessary to identify and develop funding sources for implementation of conservation actions beyond state boundaries.

### **Tier I At-risk Species**

#### **Plants:**

Missouri Sedge<sup>1</sup>

#### **Animals:**

Greater Prairie-Chicken

Henslow's Sparrow

Loggerhead Shrike

Wood Thrush

Massasauga<sup>3</sup>

Timber Rattlesnake

Iowa Skipper

Regal Fritillary

Married Underwing

Whitney Underwing

Pimpleback

Pistolgrip<sup>2</sup>

Plain Pocketbook<sup>3</sup>

Plains Harvest Mouse

#### **Aquatic Communities:**

Headwater, Warm Water Stream\*

Mid-order, Warm Water Stream

**Terrestrial Communities:**

Eastern Riparian Forest  
 Cottonwood-Peachleaf Willow Riparian Woodland  
 Mesic Bur Oak Forest and Woodland\*  
 Dry-Mesic Bur Oak Forest and Woodland\*  
 Dry Upland Bur Oak Woodland\*  
 Sandbar Willow Shrubland  
 Riparian Dogwood-False Indigobush Shrubland  
 Freshwater Seep  
 Eastern Cordgrass Wet Prairie\*  
 Eastern Sedge Wet Meadow  
 Eastern Bulrush Deep Marsh  
 Cattail Shallow Marsh  
 Upland Tall-grass Prairie\*  
 Lowland Tall-grass Prairie\*  
 Perennial Sandbar  
 Sandbar/Mudflat

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

**Thurston-Dakota Bluffs****Biologically Unique Landscape Description**

This landscape includes the steep bluffs and floodplain of the Missouri River in Thurston and Burt counties in north-central Nebraska. The majority of the bluffs support eastern deciduous forest of bur oak, basswood and ironwood. The Missouri River floodplain contains some of the last remnants of cottonwood-dominated floodplain forest and wet meadows, though the meadows are somewhat degraded. The majority of the landscape lies within the Omaha and Winnebago Indian reservations. It is the largest intact deciduous forest in the state. There are primitive roads through the forest on the reservations and many scattered houses. Much of the forest on the reservations is divided into small ownership tracts with multiple owners making conservation delivery difficult.

**Stresses Affecting Species and Habitats**

- ❖ Invasion of garlic mustard, common buckthorn and other exotic plants in woodlands
- ❖ Woody encroachment in ridge prairies
- ❖ High-grade logging on private and reservation lands
- ❖ Housing development
- ❖ Excess deer browsing
- ❖ Poorly-sited utility-scale wind turbines

### **Conservation Strategies**

- ❖ Conduct annual surveys for garlic mustard and other invasive plants in woodlands
- ❖ Develop and implement control programs for garlic mustard and other exotic woodland plants on conservation lands and reservations
- ❖ Coordinate with landowners interested in using conservation easements or voluntary fee title acquisition to protect important habitats from development and commercial logging of mature forests
- ❖ Develop and implement conservation planning in conjunction with tribes for reservation lands
- ❖ Offer financial incentives to private landowners to implement prescribed fire in the forests to control unwanted tree species and to promote native plants
- ❖ Offer educational programs to landowners and loggers about methods that improve habitat and allow for some tree removal
- ❖ Improved harvest of deer
- ❖ Communicate with energy companies and developers in an effort to minimize fragmentation and impacts to native wildlife

### **Tier I At-risk Species**

#### **Plants:**

None

#### **Animals:**

Cerulean Warbler<sup>4</sup>

Wood Thrush

Regal Fritillary

#### **Aquatic Communities:**

Headwater, Warm Water Stream

Large, Warm Water River

#### **Terrestrial Communities:**

Red Oak-Basswood-Ironwood Forest\*

Bur Oak-Basswood-Ironwood Forest\*

Dry-Mesic Bur Oak Forest and Woodland\*

Dry Upland Bur Oak Woodland\*

Freshwater Seep

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

## Willow Creek Prairies

### Biologically Unique Landscape Description

This landscape includes the Willow Creek valley and surrounding uplands in Pierce County and small portions of neighboring Madison and Antelope counties. Willow Creek is a meandering prairie stream. Its floodplain contains many wet meadows dominated by big bluestem and prairie cordgrass. Cropland is also common in the valley. The majority of the meadows are hayed. These meadows are significant in that they contain one of the state's largest remaining populations of the federally and state threatened western prairie fringed orchid.

Sand dunes, supporting dry-mesic sand prairie, occupy much of the upland bordering the stream valley. Many of these prairies are hayed and in good condition, while some are grazed and more degraded. Cropland is also common on the dunes. There are currently no protected areas in this landscape.

### Stresses Affecting Species and Habitats

- ❖ Conversion of native prairies to cropland
- ❖ Housing development
- ❖ Exotic plant invasion in native prairies, primarily leafy spurge, but also smooth brome, reed canary grass, timothy, and redtop
- ❖ Some livestock grazing practices that may reduce native plant diversity and promote uniform habitat structure
- ❖ Annual mid-summer haying of wet meadows, which impacts populations of the western prairie fringed orchid and native plant species diversity
- ❖ Center pivot development and wetland drainage, which could lower groundwater levels and degrade native prairies
- ❖ Poorly-sited utility-scale wind turbines

### Conservation Strategies

- ❖ Support voluntary implementation of ecologically-sensitive grazing and haying strategies on private and public lands in combination with prescribed fire and rest
- ❖ Protect orchid meadows and other high-quality prairies through conservation easements or voluntary fee title acquisition
- ❖ Promote grassland conservation programs
- ❖ Develop and implement cooperative leafy spurge control methods, potentially using bio-control agents, in orchid meadows and other native grasslands. Work with county weed authority and use care to protect sensitive areas (e.g., small white lady's-slipper habitat)
- ❖ Restore ditched or otherwise degraded wetlands
- ❖ Implement research projects to determine best management practices for the western prairie fringed orchid

- ❖ Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to native species. Avoid placing wind turbines in native prairies and woodlands and in close proximity to prairie grouse leks and nesting grounds. Turbines can be halted temporarily during peak migration periods for bats and birds. Pre- and post-construction monitoring should be implemented. See Nebraska Game and Parks Commission guidelines for wind energy development.

### **Tier I At-risk Species**

#### **Plants:**

Western Prairie Fringed Orchid

Wolf Spikerush<sup>4</sup>

#### **Animals:**

Bell's Vireo

Burrowing Owl

Greater Prairie-Chicken

Regal Fritillary

Plains Topminnow

Plains Pocket Mouse<sup>4</sup>

#### **Aquatic Communities:**

Headwater Warm Water Stream

#### **Terrestrial Communities:**

Sandbar Willow Shrubland

Riparian Dogwood-False Indigobush Shrubland

Freshwater Seep

Eastern Cordgrass Wet Prairie\*

Eastern Sedge Wet Meadow\*

Eastern Bulrush Deep Marsh

Cattail Shallow Marsh

Reed Marsh

Lowland Tall-grass Prairie\*

Eastern Sand Prairie\*

Sandhills Dune Prairie

Perennial Sandbar

Sandbar/Mudflat

\* Priority for conservation in this BUL

<sup>1</sup> This is the only BUL where the species is known to occur

<sup>2</sup> Known to occur in only one other BUL

<sup>3</sup> Known to occur in only two other BULs

<sup>4</sup> Known to occur in only three other BULs

